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cleaning and maintenance. The motion could also be accomplished using a rotary actuator, an electromechanical jack, or similar devices.

In one embodiment, the apparatus is used only to apply toppings to the topside of food product. The coating recycle assembly 294 is either not included in the apparatus or it is, but it is not used. However, recycle assembly 294 can be used if desired. In this embodiment, the channels 242, 244 are either not included or they are not used, such as by closing them. A non-limiting, exemplary example of a use of such an apparatus is for topping pizzas. For this, the excited frame assembly 210 and the upper pan assembly 212 do not need to be vibrated. The wire conveyor belt 326 moves the pizza along the apparatus. Toppings, such as cheese, pepperoni, and sausage, are applied with a fork-like spread that is described in U.S. Pat. No. 4,248,173, which is incorporated herein in its entirety.

To begin operation, the vibratory drive units 327, the recycle motor 312 and the wire belt motor 500, which drives shaft 400, are activated. Coating and/or topping is then fed in hopper 320 where it is carried by the drag chain 310 up the ascending portion 424 and across the upper length 324 of the recycle assembly 294. It is then deposited into hopper 303 through an opening in the center of the upper portion of channel 308. The coating and/or topping flow is then metered out of hopper 303 by adjustable openings where it is directed into distribution channels 242, 244, and trough 246. Channels 242 and 244 carry and deposit substantially equal amounts of coating and/or topping onto each side of the middle pan 324. This coating and/or topping is then spread across the width of the middle pan 324 by the use of a transverse distribution means (not shown) and/or with the assistance of a conveying device such as auger 336. This spread coating and/or topping is then carried forward by the vibratory action and is transferred onto belt 236. It is retained above the belt by the belt support pan 410.

Coating and/or topping which was discharged from hopper 303 into the upper distribution trough 246 is carried to the upper pan 214 where it is evenly spread by the upper transverse distribution means 218. The coating and/or topping is then run over the waterfall distributor member 222. The coating and/or topping then falls onto the food products which were deposited onto a layer of coating and/or topping being carried by wire conveyor belt 236 from the middle pan 324. The wire conveyor belt 236 then carries the coating and/or topping and products under cylinder rollers 270. At this point, belt support pan 410 ends and the excess coating and/or topping is allowed to drop through the wire conveyor belt 236 to scalping screen 328. Excess coating and/or topping which is carried on top of the food product is then blown off by two air manifold 282 and/or dislodged by flipping of food product from the upper conveying surface 412 to the lower conveying surface 414 of the wire conveyor belt 236. Wire conveyor belt 236 continues to carry the now coated and/or topped food product to the discharge of the apparatus.

The excess coating and/or topping which has fallen through the belt 236 and landed upon scalping screen 328 is now sifted due to the vibratory motion transmitted to it through sidewalls 322. The smaller fine crumbs fall through the sifter slots onto pan 248 where they are carried to the front of the machine and deposited into the lower section of the recycle conveyor 310. The coating and/or topping is then dragged by belt 310 inside of the trough to be deposited into hopper 303 again.

The larger pieces that are not able to fall through the slots 348 in scalping screen 328 are then collected at front of the machine and discharged out of one of the ports in sidewalls 322.

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Additional advantages of the apparatus include, but are not limited to the following. The coating and/or topping can be transferred and spread using only three conveying devices, i.e., the vibrating pan, the wire belt conveyor, and the recycle assembly 294. In contrast, previous apparatuses required six or more conveying devices to transfer and spread coatings and/or toppings. The use of the vibratory pan eliminates the need for cross feed augers and large distribution augers.

In addition, the apparatus costs less to assemble and operate due to the relative simplicity of the equipment, the reduced number of drives, reduced breeding degradation, and the ease of sanitation.

An apparatus having a wire conveyor belt 326 is advantageous because it increases the speed at which food product can move through the apparatus. In one embodiment, food product is conveyed at speeds less than or equal to 100 feet per minute (fpm), such as 60 fpm. In another embodiment, food product is conveyed at speeds less than or equal to 200 fpm. In addition, food product can be conveyed at speeds substantially equal to the food product conveyance speed of upstream food processing equipment, such as batter applicators, which oftentimes also include wire conveyor belts.

It also permits set spacing of food product going through the apparatus. This preserves the spacing of food product from upstream processes, such as batter applications. In contrast, vibrational conveyance of food products results in random spacing of food products. Preservation of food product spacing reduces or eliminates marriages of food products. Marriages have the undesirable effect of producing an uncoated portion of a food product where two or more food products touch. Not only does this result in a bad looking food product, the uncoated portion of a food product can result in more serious effects, such as leakage of food product during a frying process, resulting in bad food product and contamination of fryer oil. The uncoated food product can even produce fryer fires.

Additional advantages of including a wire belt conveyor 326 in an apparatus include eliminating food products from sticking to a vibratory pan that conveys food product in other embodiments and previous apparatuses.

While this invention has been described in conjunction with the exemplary embodiment outlined above, various alternatives, modifications, variations, improvements, and/or substantial equivalents, whether known or that are or may be presently unforeseen, may become apparent to those having at least an ordinary skill in the art. Accordingly, the exemplary embodiments of the invention as set forth above are intended to be illustrative, not limiting. Various changes may be made without departing from the spirit and scope of the invention. Therefore, the invention is intended to embrace all known or earlier developed alternatives, modifications variations, improvements and/or substantial equivalents.

What is claimed is:

1. An apparatus comprising:

- a first frame;
- spring assemblies;
- a vibrating assembly including an upper pan, a middle pan, a lower pan, and a second frame mounted to the lower pan with the spring assemblies, the second frame being an excited frame and the upper pan, the middle pan, the lower pan being vibrationally connected;
- a vibratory drive unit mounted and adapted to impart energy to the second frame; and
- a wire conveyor belt assembly including a wire conveyor belt, and a housing that receives the wire conveyor belt, the wire conveyor belt assembly being suspended inside